S 639.2 U16fewg 1953
United States.
Missouri River
Basin Studies
Fishermen-
expenditure study

STATE DOCUMENTS COLLECTION
FEB 13 1990
MONTANA STATE LIBRARY
1515 E. 6th AVE.
HELENA, MONTANA 59620

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
OFFICE OF RIVER BASIN STUDIES

WEST GALLATIN RIVER

MONTANA

FISHERMAN EXPENDITURE STUDY

1949 1950

BILLINGS, MONTANA

PLEASE RETURN
MONT. FISH & GAME DEPT.

MONTANA STATE LIBRARY
S 639.2 U16fewg 1953 c.1
Fishermen-expenditure study :West Gallat
3 0864 00065218 3

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Missouri River Basin Studies
Billings, Montana

FISHERMEN-EXPENDITURE STUDY
WEST GALLATIN RIVER, MONTANA
1949-1950

Report prepared by Missouri River Basin
Studies, Fish and Wildlife Service

Billings, Montana
May 1953

Digitized by the Internet Archive
in 2016

https://archive.org/details/fishermenexpendi1953unit

INTRODUCTION

A fisherman-expenditure study was conducted on the West Gallatin River, Montana, in conjunction with a creel census investigation there in 1949 and 1950 (Anonymous, 1951a). The study was made on the thesis that fisherman expenditures are indicative of the value of a fishery. Like other similar studies (Anonymous, 1950a, 1950b, 1952a, 1952b, and 1952c), the average daily expenditure per person for transportation, and trip, annual, and investment items were determined and applied to estimates of utilization and yield to obtain values involved.

METHODS

Information relative to mileage traveled, and trip, investment, and annual expenditures was obtained from approximately every tenth party interviewed for creel data in 1949. Only data pertaining to trip expenses and miles traveled were obtained in 1950, but these were secured from virtually all of the individuals interviewed for creel data. Since trip and transportation expenditure data were obtained for a much larger sample in 1950 and, therefore, probably are generally more representative of the average expenditure per person per day, 1949 data relative to these two items are disregarded for the purpose of this report. Annual and investment expenditures were determined in the field in 1949 only; questions relative to these expenditures were completely eliminated from the field forms in 1950 because of difficulties encountered in securing such information from fishermen (Anonymous, 1951b).

Average expenditures per person per day used in this report were derived from data obtained from fishermen contacted in the 28-mile stretch

of the river between Spanish Creek and Central Park (see creel census report, Anonymous, 1951a). Some expenditure data were obtained from fishermen contacted in 1949 on the river between the Yellowstone National Park boundary and Spanish Creek (upstream from the 28-mile stretch), but the sample was so small as to have extremely limited reliability and these were not used. No data were secured for the upper section in 1950.

Annual and investment expenditures were secured in 1949 from 259 parties (every tenth party) out of 2,430 interviewed for creel data. Annual items included expenditures for licenses, contributions to sporting activities, and hunting and fishing magazine subscriptions. These were reduced to a per-day basis, according to the number of days each individual went fishing in that year (or expected to go fishing) as determined from the individual fisherman. Investment items included the replacement value 1/ of rods, reels, other tackle, special clothing, sleeping bags, tents, camping equipment, and boats. Equipment expenses were reduced to a per-day basis by dividing by the annual usage and life expectancy. The number of times each piece of equipment was expected to be used that year was determined from the fisherman. Life expectancy was determined through an informal survey of biologists in the Office of Missouri River Basin Studies and other experienced fishermen (Anonymous, 1951b).

Trip expenditures included money spent for food, lodging, bait fees, boat rentals, other rentals, and miscellaneous items such as

---

1/ Replacement value was used to avoid necessity of including annual maintenance (Anonymous, 1951b).

refreshments, film, and the like. Only those food costs above those normally not incurred at home were included. Trip expenditures were obtained on a per-day basis for each party, and were reduced to a per-person per-day basis by dividing by the number in the party.

Mileage obtained on a party basis was prorated to the individuals in the party. Only those miles which constituted the distance from the point of origin of the fishing trip and return were used. Occasionally, an individual was visiting near by or was on a business or vacation trip to a nearby town. A standard rate of seven cents per mile was adopted for purposes of determining the transportation expenditure.

RESULTS

Annual and investment expenditures (1949 data) amounted to $2.50 per person per day. Annual expenditures were $0.39 and investment expenditures were $2.11. The total for these two items compare quite closely with the total for annual and investment expenditures of $2.68 1/ obtained through a survey of 1949 license holders (cold-water fishermen) conducted in Yellowstone County, Montana (Anonymous, 1951b); therefore, application of the data obtained in the field appears warranted. There was a slight difference in the relationship between expenditures for the individual items as determined for the two studies; i.e., $0.39 for annual items from the field study and $0.48 from the county survey, and $2.11 for

---

1/ Corrected from $3.65 for the average license holder as shown in the reference, to $2.68 for the average fishermen in the field.

investment items from the field study and $2.20 from the county survey. These differences are probably due to a difference in technique employed, and likely have little significance.

Trip expenditures, as determined in 1950 from 4,006 fishermen amounted to $0.31 per day per individual. Of this, about $0.14 was spent for food, about $0.06 for lodging, approximately $0.10 for miscellaneous items such as refreshments, film, etc., essentially $0.01 for bait, and minute portions of one cent each for fees and rentals.

The average round-trip mileage, based on information obtained from 3,992 fishermen interviewed on the 28-mile section of the river in 1950 was 13.8 miles. At 7 cents per mile the transportation expenditure was $1.67 per day. Such a low expenditure is to be expected since nonresident fishermen constituted only 6 percent of the fishing pressure and 84 percent of the residents came from within a 50-mile radius, approximately 86 percent of whom came from Bozeman or other local places within a distance of 0 to 7 miles. Although there were a few more nonresidents who utilized the 28-mile section in 1949 (9 percent), about 84 percent of the residents came from within 50 miles and 91 percent of these came from within 7 miles; thus, it can be assumed that the average round-trip mileage (and transportation expenditure) was essentially the same in both years.

Granting assumptions set forth above, the total average expenditure per person per day was $4.48. The component parts of this daily expenditure are shown graphically in Chart 1.

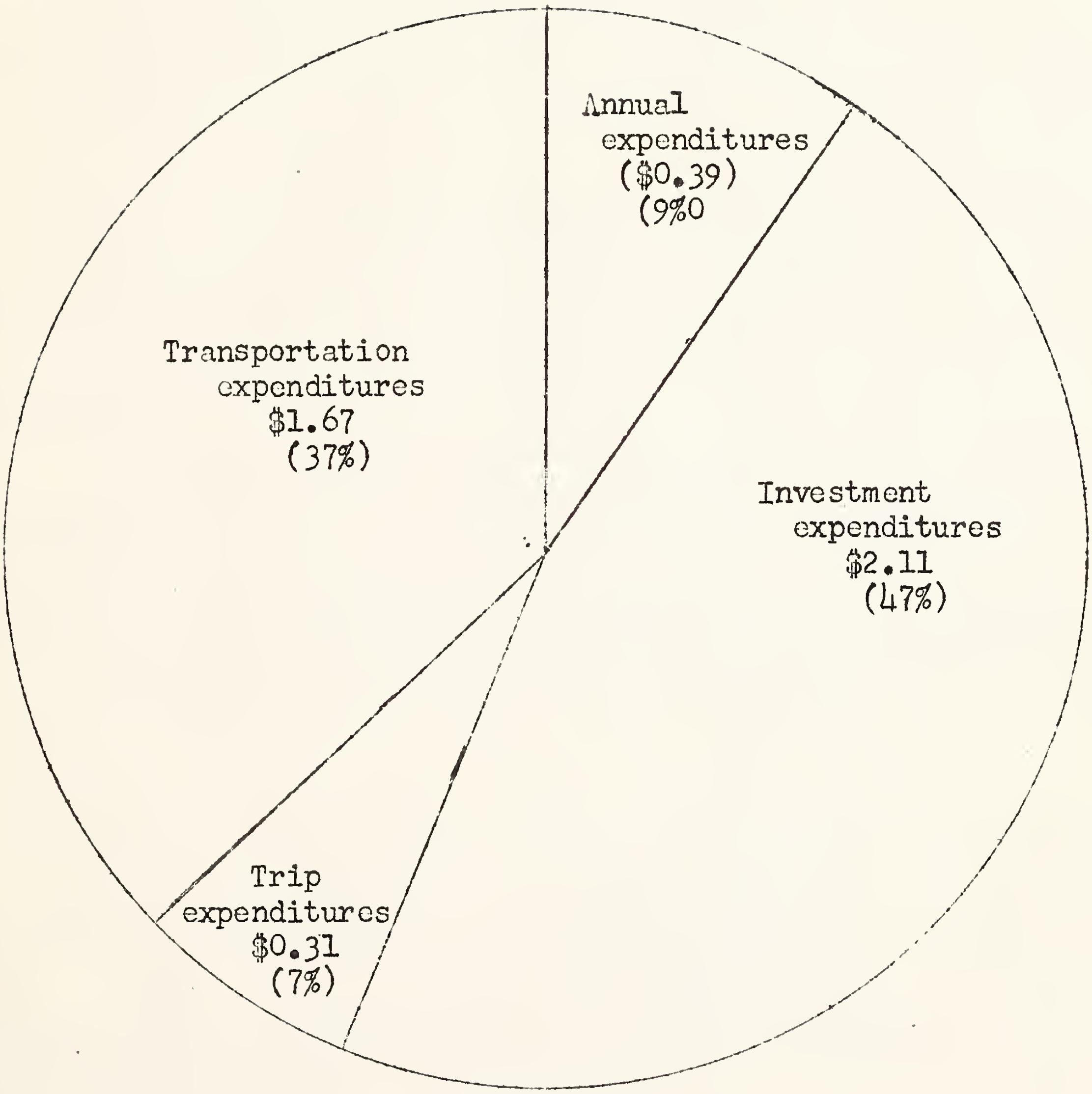

Chart 1. Percentage distribution of the component parts of the daily expenditure per person, West Gallatin River, Montana, 1949 and 1950.

Estimates of utilization (in fisherman-days) and yield (in pounds of fish) were derived for the 28-mile section in 1949 and 1950 and for the upper section in 1949 (Table 1) in the West Gallatin River creel census report (Anonymous, 1951a). Application of the $4.48 average daily expenditure per person to the 2-year average utilization for the 28-mile section of the river (12,100 fisherman-days) results in an annual value of approximately $54,200. Since the 2-year average yield for this section of the river was about 10,800 pounds, the cost per pound of fish was approximately $5.00. Each mile of stream had a worth of about $1,900.

Application of the average expenditure of $4.48 to estimates of utilization and yield for the upper section of the river (15,000 fisherman-days and 15,000 pounds of fish in 1949), results in a total value of about $67,200, $4.48 per pound of fish, and $1,200 per mile of stream (Table 1).

Table 1. Fisherman-Expenditure Data, West Gallatin River, Montana, 1949 - 1950

Item	28-Mile Section			Upper Section
	1949	1950	2-year Average	1949
Estimated utilization [1]	11,100	13,100	12,100	15,000
Average expenditure per person per day	$ 4.48	$ 4.48	$ 4.48	$ 4.48
Estimated value of fishery	$49,728	$58,688	$54,208	$67,200
Estimated yield in pounds [1]	10,300	11,300	10,800	15,000
Cost per pound of fish	$ 4.83	$ 5.19	$ 5.02	$ 4.48
Miles of stream [1]	28	28	28	55
Value per mile of stream	$1,776	$2,096	$1,936	$1,222

---

[1] Anonymous, 1951a.

Application of the average expenditure per person per day as determined for the 28-mile section of the West Gallatin ($4.48) to the 55-mile upper section results in minimum values for the upper section. If adequate data had been available from the upper section, a considerably higher average expenditure per person per day undoubtedly would have been secured, and this in turn would have affected the expenditure per pound of fish and per mile of stream, as well as the overall value. Of the many factors which might contribute to an expected higher expenditure, radius of influence and the percentage of nonresidents are probably most important. The upper section of the river was at least 18 to 20 miles (at the nearest point) from the main centers of population from which the greatest utilization could be expected (Bozeman and West Yellowstone) as compared to the approximate 7 miles or less distance for the lower section (about 91 percent of the residents come from within 7 miles - see page 4); thus, it becomes obvious that the average round-trip mileage, and the attendant expenditure for transportation, would be somewhat greater. Approximately 32 percent of the fishing parties contacted in the upper section were nonresidents, whereas, less than 10 percent (9 percent in 1949 and 6 percent in 1950) of the parties contacted in the 28-mile stretch were nonresidents. Nonresidents ordinarily travel longer distances to reach a fishery than the local people, also have larger trip expenses for food, lodging, etc., and frequently have more expensive equipment; therefore, the expected average expenditure per person per day would be greater for the upper section. There is no way of translating the above ideas into the additional values which certainly existed, but the factors outlined should be taken into account in any consideration of the values of the upper section of the West Gallatin River.

DISCUSSION

Results of expenditure studies similar to those for the West Gallatin River have been analyzed for a number of other fisheries. These data are shown comparatively in Tables 2 and 3. It will be noted that there is considerable variation. Several factors are involved. Of these factors, the radius of influence (miles traveled) is one of the most important, as it in turn affects trip expenditures for lodging and meals (Table 2). The type of fishery involved also is an important factor as investment expenditures (and sometimes annual expenditures) are generally much higher for cold-water fishermen than for warm-water fishermen because of the more expensive type of equipment ordinarily used by cold-water fishermen (Anonymous, 1951b). The average cost per pound of fish is affected not only by the total expenditure per person per day, but also by the rate of catch (Table 3). Generally speaking, cold-water fishermen have a higher expenditure per person per day than do warm-water fishermen and cold-water fish (trout) cost the fisherman more per pound than do warm-water fish.

Table 2. Comparison of Component Parts of the Average Total Expenditure per Person per Day for the West Gallatin River, Montana, with Other Fisheries in the Missouri River Basin

Fishery	Type of Fishery	Average Round-trip Mileage (Rounded)	Average Expenditure per Person per Day					Reference
			Transportation	Trip Items	Annual Items	Investment Items	Total	
Ocean Lake, Wyoming, 1947-1949	Warm water	68	$ 4.77	$ 2.90	$ 0.43	$ 1.12	$ 9.22	Anon., 1950a
Lake Maloney, Nebraska, 1949-1950	do.	20	1.41	0.47	0.09	0.45	2.42	Anon., 1950b
Republican River, Nebraska and Kansas, 1951	do.	15	1.09	0.17	[1]0.09	[1]0.45	1.80	Anon., 1952a
Fort Peck Reservoir, Montana, 1948-1950	Warm-cold water	22	1.42	0.40	0.33	0.63	2.78	Anon., 1952b
Pathfinder Reservoir, Wyoming, 1951	Cold water	48	3.39	1.33	[2]0.45	[2]2.05	7.22	Anon., 1952c
Alcova Reservoir, Wyoming, 1951	do.	36	2.49	0.80	[2]0.45	[2]2.05	5.79	Do.
Fremont Canyon, Wyoming, 1951	do.	49	3.40	0.59	[2]0.45	[2]2.05	6.49	Do.
WEST GALLATIN RIVER, MONTANA, 1949-1950	do.	14	1.67	0.31	0.39	2.11	4.48	- - - -

---

[1] Applied from results obtained at Lake Maloney.

[2] Applied from results obtained from Yellowstone County survey (Anonymous, 1951b).

Table 3. Comparison of Average Expenditures per Person per Day, per Pound of Fish and per Surface Acre or Mile of Stream for the West Gallatin River, Montana, with Other Fisheries in the Missouri River Basin

Fishery 1/	Type of Fishery	Size of Fishery Acres (A) or Miles (M)	Average Rate of Catch (Fish/Hour)	Average Expenditure			
				Per Person per Day	Per Pound per Day	Per Surface Acre	Per Mile of Stream
Ocean Lake, Wyoming, 1947-1949	Warm water	6,100 A	6.40	$9.22	$1.28	$18.66	
Lake Maloney, Nebraska, 1949-1950	do.	1,540 A	0.56	2.42	1.09	25.96	
Republican River, Nebraska and Kansas, 1951	do.	43 M	0.09	1.80	2.50		$ 733.00
Fort Peck Reservoir, Montana, 1948-1950 2/	Warm-cold water	245,000 A	0.65	2.80	1.60	- -	- - -
Pathfinder Reservoir, Wyoming, 1951 3/	Cold water	22,600 A	0.15(0.05)	7.22	3.54(8.27)	2.51	
Alcova Reservoir, Wyoming, 1951 3/	do.	2,500 A	0.26(0.09)	5.79	5.39(10.76)	11.00	
Fremont Canyon, Wyoming, 1951 3/	do.	4 M	0.21(0.02)	6.49	4.61(9.22)		2,190.00
WEST GALLATIN RIVER, MONTANA, 1949-1950 (Middle section)	do.	28 M	0.54	4.48	5.02		1,940.00
WEST GALLATIN RIVER, MONTANA, 1949 (Upper section)	do.	55 M	1.07	4.48	4.71		1,220.00

1/ See Table 2 for references.

2/ Value per surface acre or mile of stream not determined because fishery confined to undeterminable limited portion of total area available.

3/ Parenthetical figure for trout only, other for all fish.

LITERATURE CITED

Anonymous

1950a. An evaluation of the Ocean Lake fishery, Wyoming, 1947-1949. U.S.D.I., Fish & Wild. Ser., Mo. Riv. Basin Studies, 15 pp. (Mimeo.)

1950b. An evaluation of the Lake Maloney, Nebraska, fishery, 1948-1949. U.S.D.I., Fish & Wild. Ser., Mo. Riv. Basin Studies, 10 pp. (Mimeo.)

1951a. A two-year fishery investigation of the West Gallatin River, Montana, 1949 and 1950. U.S.D.I., Fish & Wild. Ser., Mo. Riv. Basin Studies, 38 pp. (Mimeo.)

1951b. Annual and investment expenditures of Montana sportsmen, 1949. U.S.D.I., Fish & Wild. Ser., Mo. Riv. Basin Studies, 35 pp. (Mimeo.)

1952a. A one-year creel census and evaluation of the Republican River, Nebraska and Kansas, 1951. U.S.D.I., Fish & Wild. Ser., Mo. Riv. Basin Studies, 299 pp. (Mimeo.)

1952b. A three-year fishery investigation, Fort Peck Reservoir, Montana, 1948-1950. U.S.D.I., Fish & Wild. Ser., Mo. Riv. Basin Studies, 49 pp. (Mimeo.)

1952c. One-year creel census and fisherman expenditure study, Alcova and Pathfinder Reservoir, North Platte River, Wyoming. U.S.D.I., Fish & Wild. Ser., Mo. Riv. Basin Studies, 43 pp. (Mimeo.)